CLAIMS

1. A method comprising of:

supplying an input bit stream to a channel coding block;

modulating an output of the channel coding block to provide a modulation symbol sequence; and

feeding the modulation symbol sequence to a plurality of orthogonal sequence covers, wherein each of the plurality of orthogonal sequence covers outputs one of a plurality of spread sequences of output chips, and further wherein the plurality of spread sequences of output chips are to be transmitted over a multiple-input multiple-output channel.

2. The method of claim 1 wherein the feeding step comprises of feeding a replica of the modulation symbol sequence to each of the plurality of orthogonal sequence covers.

3. The method of claim 1 wherein the feeding step comprises time demultiplexing the modulation symbol sequence to simultaneously provide a portion of the modulation symbol sequence to each of the plurality of orthogonal sequence covers.

4. The method of claim 1 wherein the plurality of orthogonal sequence covers comprises mutually orthogonal Walsh covers.

5. The method of claim 1 wherein the modulating step comprises modulating the output of the coding block using trellis coded quadrature amplitude modulation.

6. The method of claim 1 wherein the coding block performs rate (n -1)/n trellis coding on the input bit stream.

7. The method of claim 1 further comprising:

frequency coding the modulation symbol sequence after the modulating step and before the feeding step;

performing inverse FFT and cyclic prefix processing after the feeding step and before the transmitting step.

8. A method comprising of:

supplying an input bit stream to a coding block;

modulating an output of the trellis code block to provide a first modulation symbol sequence;

diversity encoding the first modulation symbol sequence to generate a second modulation symbol sequence; and

feeding the second modulation symbol sequence to a plurality of orthogonal sequence covers, wherein each of the plurality of orthogonal sequence covers outputs one of a plurality of spread sequences of output chips, and further wherein the plurality of spread sequences of output chips are to be transmitted over a multiple-input multiple-output channel.

9. The method of claim 8 wherein the diversity encoding is space-time encoding.

10. The method of claim 8 wherein the diversity encoding is space-frequency encoding.

11. The method of claim 8 wherein the feeding step comprises feeding a replica of the second modulation symbol sequence to a pair of the plurality of orthogonal sequence covers.

12. The method of claim 8 wherein the diversity encoding step comprises demultiplexing the first modulation symbol sequence, whereby a portion of the first modulation symbol sequence corresponding to a pair of the plurality of orthogonal sequence covers is simultaneously diversity encoded, so as to provide a portion of the second modulation symbol sequence to each of the plurality of orthogonal sequence covers.

13. The method of claim 8 wherein the plurality of orthogonal sequence

covers comprise pairwise mutually orthogonal Walsh covers.

14. The method of claim 8 wherein the modulating step comprises modulating the output of the coding block using trellis coded quadrature amplitude modulation.

15. The method of claim 8 further comprising:

frequency coding the modulation symbol sequence after the modulating step and before the feeding step;

performing inverse FFT and cyclic prefix processing after the feeding step and before the transmitting step.

16. A wireless apparatus comprising:

a coding block configured to encode an input bit stream;

a modulator configured to receive an output of the coding block to provide a modulation symbol sequence; and

a plurality of orthogonal sequence covers, wherein the modulation symbol sequence is fed to the plurality of orthogonal sequence covers and each of the plurality of orthogonal sequence covers outputs one of a plurality of spread sequences of output chip, and further wherein the plurality of spread sequences of output chips are to be transmitted over a multiple-input multiple-output channel.

17. The wireless apparatus of claim 16 wherein a replica of the modulation symbol sequence is fed to each of the plurality of orthogonal sequence covers.

18. The wireless apparatus of claim 16 wherein the modulation symbol sequence is time demultiplexed to simultaneously provide a portion of the modulation symbol sequence to each of the plurality of orthogonal sequence covers.

19. The wireless apparatus of claim 16 wherein the plurality of orthogonal sequence covers comprises mutually orthogonal Walsh covers.

20. The wireless apparatus of claim 16 wherein the modulator is configured

to modulate the output of the coding block using trellis coded quadrature amplitude modulation.

21. The wireless apparatus of claim 16 wherein the coding block performs rate (n -1)/n trellis coding on the input bit stream.

22. The wireless apparatus of claim 16 further comprising:

a frequency coder configured to frequency code the modulation symbol sequence to simultaneously provide a portion of the modulation symbol sequence to each of the plurality of orthogonal sequence covers;

an inverse FFT processor configured to transform the output of each of the plurality of orthogonal sequence covers from the frequency domain into the time domain to provide the plurality of spread sequences of output chips.

23. A wireless apparatus comprising:

a coding block configured to encode an input bit stream;

a modulator configured to receive an output of the coding block to provide a first modulation symbol sequence;

an Alamouti block configured to diversity encode the first modulation symbol sequence to generate a second modulation symbol sequence; and

a plurality of orthogonal sequence covers, wherein the second modulation symbol sequence is fed to the plurality of orthogonal sequence covers and each of the plurality of orthogonal sequence covers outputs one of a plurality of spread sequences of output chips, and further wherein the plurality of spread sequences of output chips are to be queued for transmission over a multiple-input multiple-output channel.

24. The wireless apparatus of claim 23 wherein the Alamouti block is configured to diversity encode using space-time encoding.

25. The wireless apparatus of claim 23 wherein the Alamouti block is configured to diversity encode using space-frequency encoding.

26. The wireless apparatus of claim 23 wherein a replica of the second

modulation symbol sequence is fed to a pair of the plurality of orthogonal sequence covers.

27. The wireless apparatus of claim 23 wherein the first modulation symbol sequence is demultiplexed, whereby a portion of the first modulation symbol sequence corresponding to a pair of the plurality of orthogonal sequence covers is simultaneously diversity encoded, so as to provide a portion of the second modulation symbol sequence to each of the plurality of orthogonal sequence covers.

28. The wireless apparatus of claim 23 wherein the plurality of orthogonal sequence covers comprises pairwise mutually orthogonal Walsh covers.

29. The wireless apparatus of claim 23 wherein the modulating step comprises modulating the output of the coding block using trellis coded quadrature amplitude modulation.

30. The wireless apparatus of claim 23 further comprising:

a frequency coder configured to frequency code the modulation symbol sequence to simultaneously provide a portion of the modulation symbol sequence to each of the plurality of orthogonal sequence covers ; and

an inverse FFT processor configured to transform the output of each of the plurality of orthogonal covers from the frequency domain into the time domain to provide the plurality of spread sequences of output chips.

31. A wireless apparatus comprising:

a plurality of orthogonal sequence covers, wherein each of the plurality of orthogonal sequence covers depreads a chip sequence and outputs one of a plurality of sequences of symbols, and further wherein the chip sequence is received through a multiple-input multiple-output channel;

a plurality of metric generation units configured to receive one of the plurality of sequences of symbols; and

a decoding block which decodes the plurality of sequences of symbols responsive to a plurality of metrics generated by the plurality of metric generation units.

32. The wireless apparatus of claim 31 wherein the plurality of sequences of symbols represent replicas of a single sequence of source symbols at a transmitter.

33. The wireless apparatus of claim 31 wherein the plurality of sequences of symbols represent a plurality of transmitter symbol sequences which were time-demultiplexed from a single sequence of source symbols at the transmitter.

34. The wireless apparatus of claim 31 wherein the plurality of orthogonal sequence covers comprises mutually orthogonal Walsh covers.

35. The wireless apparatus of claim 31 wherein the decoding block is configured for trellis decoding.

36. The wireless apparatus of claim 31 wherein the decoding block performs rate (n -1)/n trellis decoding.

37. The wireless apparatus of claim 31 further comprising:

a frequency decoder configured to frequency decode the plurality of sequences of symbols and output the frequency-decoded symbols to the decoding block; and

a plurality of FFT processors configured to transform a plurality of orthogonal spread sequences from the time domain into the frequency domain to provide a plurality of chip sequences, one of the plurality of chip sequences providing the input for the plurality of orthogonal sequence covers.

38. A wireless apparatus comprising:

means for channel coding an input bit stream;

means for modulating an output of the channel coding block to provide a modulation symbol sequence; and

means for spreading the modulation symbol sequence using a plurality of orthogonal sequence covers, wherein each of the plurality of orthogonal sequence covers outputs one of a plurality of spread sequences of output chips, and further wherein the plurality of spread sequences of output chips are to be transmitted over a

multiple-input multiple-output channel.

39. A wireless apparatus comprising:

means for despreading a chip sequence using a plurality of orthogonal sequence covers, wherein each of the plurality of orthogonal sequence covers outputs one of a plurality of sequences of symbols, and further wherein the chip sequence is received through a multiple-input multiple-output channel;

means for generating decoding metrics using a plurality of metric generation units configured to receive one of the plurality of sequences of symbols; and

means for decoding the plurality of sequences of symbols responsive to the decoding metrics.